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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,241	09/22/2003	Riki Ogawa	243056US2SRD	9498

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EXAMINER	
PATEL, JAYESH A	

ART UNIT	PAPER NUMBER
2624	

NOTIFICATION DATE	DELIVERY MODE
05/15/2008	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	10/666,241	OGAWA ET AL.	
	Examiner	Art Unit	
	JAYESH A. PATEL	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *16 April 2008*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-12* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-12* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *17 February 2004* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 04/16/2008 has been entered.

Response to Arguments

2. The arguments with respect to independent Claim 1 that Kim does not disclose "detecting the loss of reflected light and fixing the specimen surface to a reference level if the loss of the reflected light is detected" on page 7, the examiner disagrees. Kim discloses the detection of the reflected light in abstract. Kim further discloses a means to correct the fluctuation in the intensity of the signals on the first and a second photo receivers due to the fluctuation in the intensity of light emitted from the light source at **(Col 8 Lines 18-20 where the fluctuation in the intensity is due to the lose of the incident light)**. Kim further discloses the control part 350 adjust the gains to adapt to the intensity of signals to a proper value and finally adjusting the stage to move the substrate to a proper level where the focus is at a fixed level at **(Col 6 Lines 60-67 and Col 8 Lines 65 through Col 9 Lines 7)**. Applicant argues with respect to Claim 7 that

Kim does not disclose "Fixing the level **(focus)** of the specimen surface to a reference level **(by adjusting the substrate on the stage)** at the projected position **(focus level of the captured image)** corresponding to the recorded position information (**focus level of the reference image)"**, the examiner disagrees. Kim at **(Col 7 Lines 33-35 and Lines 50-53)** discloses the above limitation. Kim discloses that if the specimen is out of the fixed focus than the arrangement signal **(fixing the level signal)** determined from a correlated function **(comparison)** has a smaller value than the maximum value **(a value level at which the specimen at the best or focus or reference level)** , whereas if a specimen is exactly on a fixed focus the arrangement signal has a maximum value **(corresponding to the maximum value of the arrangement signal)** and therefore Kim adjusts the arrangement signal to the maximum value to bring the projected position **(which is out of fixed focus position)** to the recorded position **(to the exact fixed position when recorded before the comparison)**. Thus Kim discloses adjusting the level of the surface of the specimen (Element 200) on which the target 300 is placed by adjusting the Z level. The applicant further argues on Page 7 that "Only the detecting of a Loss of the intensity of light is necessary and not the measuring" is not recited in the claim.

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1-3 and 5 are rejected under 35 U.S.C. 102(b) as being anticipated by Kim (US 5742397) hereafter Kim.

Regarding Claim 1, Kim discloses a specimen surface level adjusting method in **(Fig 3)** used in a pattern inspecting apparatus for inspecting a pattern on a specimen surface on the basis of a detected image obtained by projecting inspecting light onto the specimen surface, the specimen surface level adjusting method comprising: projecting level measuring light onto the specimen surface **(Element 1)** and **(Col 7 Lines 12 –22)**; detecting the position of the measuring light reflected on the specimen surface **(Elements 22,4,5 ,21 and 12) and (Col 1 Lines 42-44)** ; calculating the level of the specimen surface on the basis of the position of the optical axis at **(Col 2 Lines 16-22 and Col 7 Lines 33-35)** ;adjusting the level of the specimen surface so that the calculated level may be held within the depth of focus of a pattern inspecting optical system at **(Col 7 Lines 33-35 and Col 7 Lines 43-49)** ; detecting the loss of the reflected light **(Elements 11 and 12, Fig 7 graph where the arrangement signal indicates a loss of reflected light detected by the photoreceivers 11 and 12. Abstract**

discloses detecting the reflected light and moreover there is always a loss of light after being reflected from the surface, Col 8 Lines 18-20 where the means to correct the fluctuation (loss) in the intensity of the signals reaching the first and second photoreceivers means there is a loss detected in the reflected light); and fixing the specimen surface to a reference level **(fixed focus point having maximum intensity value)**, if the loss of light is detected **(Col 7 Lines 37- 53 where the arrangement signal has less value due to the loss of light than the maximum value and the control part adjusts the arrangement value to the maximum value and bring the target into focus,Col 6 Lines 60-67 and Col 8 Lines 65 through Col 9 Lines 7)**.Kim also discloses comparing a standard image **(having intensity at threshold value)** with the images formed from two photo detectors at **(Col 7 Lines 26-27)** and the result of the comparison which is fed to **(Element 350)** to fix the specimen surface. Kim further discloses **(Col 8 Lines 46-47)** where the light is reflected twice by the target shows a loss in the intensity of the light to the signal reflected from the target.

Regarding Claim 2, Kim discloses the specimen surface level adjusting method according to claim 1, wherein the measuring light is projected diagonally onto the specimen surface in **(Fig 3)**. The Light source 1 transmits light and is guided by the mirror 4 on the target 300 diagonally.

Regarding Claim 3, Kim discloses the specimen surface level adjusting method according to claim 1, wherein the reference level is the level immediately before the specimen surface is fixed at **(Fig 1 and Col 2 Lines 16-26)**. Kim also discloses adjusting the value of the arrangement signal **(to drive the stage 200)** to the maximum value **(level when the specimen is at the fixed focus)** is considered as the reference level at **(Col 7 Lines 43-53)**.

Regarding Claim 5, Kim discloses the specimen surface level adjusting method according to claim 1, wherein the reflected light is caused to enter an optical sensor **(Fig 3 Elements 5 and 21)** including a plurality of photoelectric conversion elements **(Fig 3 Elements 11 and 12)**, and at least one of the position of the optical axis and the intensity is detected by monitoring the photoelectric conversion output of each of said plurality of photoelectric conversion elements **(Fig 3 Element 350)**.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable Kim and in further view of Kawashima et al. (US 5124562) hereafter Kawashima.

Regarding Claim 4, Kim discloses the specimen surface level adjusting method according to claim 1. Kim also discloses the reference level at **(Col 7 Lines 43- 53)** where the fixed focus image having maximum intensity image value is the reference level. Kim however does not disclose the reference level is the average value of the level in a specific period of time before the specimen surface is fixed.

Kawashima discloses the reference level is the average value of the level in a specific period of time before the specimen surface is fixed at **(Col 11 Lines 3-6)**. Kawashima discloses detecting the surface position of an object quickly and with high precision **(Col 2 Lines 53-55)**. Both Kim and Kawashima are analogous art and from the same field of endeavor, therefore it would have been obvious for one of ordinary skill in the art, at the time the invention was made to use the teachings of Kawashima in the device disclosed by Kim for the above reasons.

5. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable Kim , Kawashima and in further view of Yamada et al. (US 5323016) hereafter Yamada.

Regarding Claim 6, Kim and Kawashima disclose the specimen surface level adjusting method according to claim 1. Kim **(Fig 3 Element 200)** discloses the Stage. Kim and Kawashima however do not disclose specimen surface is

placed on a piezoelectric element, and a voltage applied to the piezoelectric element adjusts the level of the specimen surface.

Yamada discloses the specimen surface **(stage 3)** supported by three piezoelectric devices at **(Col 10 Lines 50-52)**. Also the fact that actuating the piezoelectric devices **(Col 10 Lines 50-52)** means an electrical signal (voltage) is applied to create motion. Kim and Yamada are from the same field of endeavor and it would have been obvious for one of ordinary skill in the art to detect and correct the deviation of the specimen on the surface while keeping the specimen at the site without large displacement at correction **(Col 1 Lines 21-38)** as taught by Yamada in the apparatus of Kim.

6. Claims 7 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toida et al. (US6522911) hereafter Toida in further view of Kim.

Regarding Claim 7, Toida discloses a specimen surface level adjusting method in **(Figs 1 and 3)** used in a pattern inspecting apparatus for inspecting a pattern on a specimen surface on the basis of a detected image obtained by projecting inspecting light onto the specimen surface, the specimen surface level adjusting method comprising: projecting first measuring light for level measurement onto the whole of the specimen surface **(Element 11 and Col 6 Lines 15-25))**; detecting the intensity of the reflected light of the first measuring

light **(Elements 15 and 17)**; projecting second measuring light for level measurement onto the specimen surface **(Element 12 and Col 6 Lines 37-59)**; detecting the position of the optical axis of the reflected light of the second measuring light **(Element 16 and 18)**. Toida also discloses the movement of the stage in the X and Z direction at **(Col 7 Lines 35-49)**, however is silent about fixing the level of the specimen surface to a reference level at the projected position corresponding to the recorded position information.

Toida however does not disclose recording position information about projected position where the intensity is less than a specific threshold value; calculating the level of the specimen surface on the basis of the position of the optical axis; adjusting the level of the specimen surface so that the calculated level may be held within the depth of focus of a pattern inspecting optical system; and fixing the level of the specimen surface to a reference level at the projected position corresponding to the recorded position information.

Kim discloses recording position information about projected position where the intensity is less than a specific threshold value at **(Col 7 Lines 36-49)**; calculating the level of the specimen surface on the basis of the position of the optical axis and adjusting the level of the specimen surface so that the calculated level may be held within the depth of focus of a pattern inspecting optical system at **(Col 7 Lines 50-53)**; and fixing the level of the specimen surface to a reference level at the projected position corresponding to the recorded position information at **(Col 7 Lines 33-35 and Lines 50-53)**. Both Toida and Kim are

from the same field of endeavor, therefore it would be obvious for one of ordinary skill in the art at the time the invention was made to place the specimen horizontal and adjusting the position and slope precisely **(Col 1 Lines 31-33)** as taught by Kim in the imaging apparatus of Toida.

Regarding Claim 11, Toida discloses the specimen surface level adjusting method according to claim 7, wherein the reflected lights of the first and second measuring lights are caused to enter an optical sensor **(Fig 1 Elements 40,33 and 41,42)** including a plurality of photoelectric conversion elements **(Elements 15 and 16)**, and at least one of the position of the optical axis and the intensity is detected by monitoring the photoelectric conversion output of each of said plurality of photoelectric conversion elements **(Elements 17 and 18)**.

7. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toida, Kim and in further view of Macosch et al (US 4298283) hereafter Makosch.

Regarding Claim 8,Toida and Kim discloses the specimen surface level adjusting method according to claim 7.Toida and Kim, however do not disclose wherein the first and second measuring lights are projected from a single light source diagonally onto the specimen surface.

Makosch discloses an interferometeric measuring method for level measurement in **(Fig1)**. Makosch discloses **(Element 1)** generates a light beam and the two measuring lights as **(o and eo)** at **(Col 4 Lines 10-31)**. Makosch discloses the method has a resolution in the Armstrong range, measuring times in the micro seconds range and is relatively simple and economical at **(Col 2 Lines 49-53)**. Therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to utilize the teachings of Makosch in the apparatus and methods of Toida and Kim for the above reasons.

8. Claims 9 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toida, Kim and in further view of Kawashima et al. (US 5124562) hereafter Kawashima.

Regarding Claim 9,Toida discloses the specimen surface level adjusting method according to claim 7. Toida also discloses the movement of the stage in the X and Z direction at **(Col 7 Lines 35-49)** to move the specimen, however is silent about the reference level is the level immediately before the specimen surface is fixed.

Kim discloses the reference level is the level immediately before the specimen surface is fixed at **(Fig 1 and Col 2 Lines 16-26 and Fig 4)**. The change in the surface levels will change the detected intensity values resulting in different arrangement signal value. Kim also discloses adjusting the value of the

arrangement signal **(to drive the stage 200)** to the maximum value (level when the specimen is at the fixed focus) is considered as the reference level at **(Col 7 Lines 43-53)**. The best focus level is the reference level and the signal resulting from the crooked specimen **(signaling the stage driver to fix the specimen)** is the surface level after the reference level. Kim also discloses determining the position change of specimen 300 through the position change of light spot impinging on a detector, a user can **choose the specimen position** by driving the specimen support 200 through stage driver 350 **(Col 2 Lines 26-27)**. Both Toida and Kim are from the same field of endeavor, therefore it would have been obvious for one of ordinary skill in the art at the time the invention was made to use the teachings of Kim in the apparatus of Toida for the above reasons.

Regarding Claim 10, Toida discloses the specimen surface level adjusting method according to claim 7. Kim also discloses the reference level at **(Col 7 Lines 43- 53)** where the fixed focus image having maximum intensity image value is the reference level. Kim however does not disclose the reference level is the average value of the level in a specific period of time before the specimen surface is fixed.

Kawashima discloses the reference level is the average value of the level in a specific period of time before the specimen surface is fixed at **(Col 11 Lines 3-6)**. Kawashima discloses detecting the surface position of an object quickly and with high precision **(Col 2 Lines 53-55)**. Toida, Kim and Kawashima are

analogous art (Imaging) and from the same field of endeavor, therefore it would have been obvious for one of ordinary skill in the art, at the time the invention was made to use the teachings of kawashima in the device and apparatus disclosed by Kim and Toida for the above reasons.

9. Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toida, Kim and in further view of Yamada et al. (US 5323016) hereafter Yamada.

Regarding Claim 12, Toida and Kim disclose the specimen surface level adjusting method according to claim 7. Both Toida **(Fig 3 Element 50)** and Kim **(Fig 3 Element 200)** disclose the Stage. Toida and Kim however do not disclose specimen surface is placed on a piezoelectric element, and a voltage applied to the piezoelectric element adjusts the level of the specimen surface.

Yamada discloses the specimen surface **(stage 3)** supported by three piezoelectric devices at **(Col 10 Lines 50-52)**. Toida, Kim and Yamada are from the same field of endeavor and it would have been obvious for one of ordinary skill in the art to detect and correct the deviation of the specimen on the surface while keeping the specimen at the site without large displacement at correction **(Col 1 Lines 21-38)** as taught by Yamada in the apparatus and methods of Toida and Kim.

OTHER PRIOR ART

Other prior art relevant to the subject matter and not relied on are (US 6597006), (US 6107637) and (US 5227862).

Conclusion

10. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAYESH A. PATEL whose telephone number is (571)270-1227. The examiner can normally be reached on M-F 7.00am to 4.30 pm (5-4-9). If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Bhavesh Mehta can be reached on 571-272-7453. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

05/09/08
/Jayesh A Patel/ **/YOSEF KASSA/**

Examiner, Art Unit 2624

Primary Examiner, Art Unit 2624